



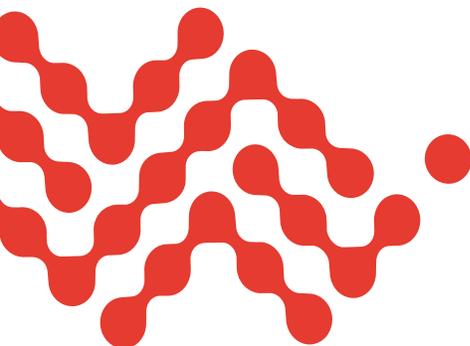
# SD-WAN



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## How SD-WAN Simplifies Cloud-Based Connectivity

Modern enterprise networks are becoming more challenging to manage as companies grapple with growing data volumes, shifting traffic requirements, complex infrastructures and cloud adoption. Tomorrow's enterprise network environment will need a more agile form of connectivity management to stay ahead of the curve.



Software-defined approaches to IT infrastructure have solved problems in enterprise storage, computing resources and local area networks. Now, companies can apply the same software-defined principles to wide-area networks in the form of SD-WAN solutions.

Sierra Wireless' Managed Connectivity Solutions (MCS) complement SD-WAN providers' solutions such as Bigleaf Networks, to bring a new class of wide-area network service management to customers.

This white paper explains the challenges facing modern enterprise networks, what to look for when choosing an SD-WAN and how the partnership between Sierra Wireless and Bigleaf can help.

## Challenges Facing Modern Enterprise Networks

Things are getting more challenging for network architects and managers in several ways. Here are some examples of the pressures they face today.

### IT LACKS RESOURCES

IT departments are coping with rapidly evolving requirements. They strive to satisfy business departments' shrinking time-to-market needs with faster software and infrastructure deployments while exploring newer computing paradigms in areas such as IoT, AI and cloud applications and services. They are dealing with stricter data management requirements, spawning a range of compliance projects.

These pressures eat into IT finances, forcing technology departments to be more budget-conscious when providing network administration and reconfiguration services. This makes manual interventions less workable.

### NETWORKS ARE BECOMING MORE COMPLEX

As usage habits evolve, networks are becoming more complex. Those accessing enterprise networks include not just employees but contractors, freelancers, suppliers, business partners and customers. Many of these users are now mobile, accessing the network from outside the firewall, meaning that networks are now open to not only the employees of a given company, but also the broader ecosystem of suppliers, customers and business partners.

### DATA TRAFFIC IS CHANGING.

Data volumes are increasing. In 2022, more IP traffic will cross global networks than in all prior years since the internet emerged. Business IP traffic will enjoy a 23% CAGR between 2017 and 2022, reaching 63.31 Exabytes globally.<sup>1</sup>

This is partly because of the rapid growth in traffic diversity. Traditional text-based use cases, such as text-heavy browsing and email, are giving way to more multimedia and real-time streaming applications.

Today, these applications range from IP telephony to audio, real-time collaborative messaging and video.

Tomorrow will see new classes of traffic hitting the mainstream, ranging from streaming IoT to augmented reality and virtual reality traffic. Global VR/AR traffic will increase twelve-fold between 2017 and 2022, reaching 4.02 Exabytes in total.<sup>2</sup>

#### INCREASED DEMAND ON THE NETWORK

These changing traffic and usage patterns are putting more demand on the network. Users need more reliability from their wide-area networks as applications become more important. Soft PBX systems cannot suffer disruption, for example. Real-time applications in the cloud cannot fail without disrupting the business.

Users need better performance to support low-latency apps, such as video and audio. Disruptions in packet rate cause jitter or buffering problems that are far more obvious in streaming applications than they are in asynchronous ones.

## SD-WAN Can Help

SD-WAN is a tool that can breathe new life into wide-area networks, increasing both reliability and performance. As a software layer that sits atop traditional network infrastructure, it offers an easy way to enhance users' experience while reducing overall complexity and administrative cost.

The benefits of an SD-WAN include:

#### IMPROVED UPTIME

A well-designed SD-WAN can use multiple connections to a single location, with connections of different types and from different carriers, if preferred. If one connection fails or experiences performance issues like latency, jitter or packet loss, the site can continue operating over the other connection. This can improve connection downtime, especially in areas with unreliable connectivity.

#### ENSURE QUALITY OF SERVICE

SD-WANs use software to watch and manage network equipment, making it possible to rank traffic without manual reconfiguration of physical network devices.

#### SIMPLIFY NETWORK MANAGEMENT

Network management problems have often required physical changes to the network to solve issues. By using software to configure and control network devices, SD-WANs make it easier for network managers to see and control network operations across the whole stack and adapt the network to cope with changing conditions.

## Considerations When Choosing an SD-WAN

SD-WAN is a promising technology for enterprise customers facing modern network challenges, but companies should enter the evaluation and procurement stage with care.

There are as many interpretations and varieties of SD-WAN as there are vendors. Companies must understand their requirements for a solution before testing the different options.

Here are some considerations to remember and questions to ask when choosing an SD-WAN solution to support your enterprise network infrastructure now and into the future.

- **CAN IT SUPPORT ALL SOURCES OF CLOUD TRAFFIC AS YOU EVOLVE?**

Given the growth of cloud-based services, your SD-WAN should be able to offer reliability and QoS improvements for any source of application traffic, including any kind of cloud-based applications. Choose a solution that supports any cloud application your business needs to use now and in the future.

- **DOES IT OPTIMIZE THE CONNECTION TO YOUR NETWORK?**

SD-WAN solutions should be able to offer at least dual connections to a site so that the site can fail over if a connection experiences a problem. In a well-designed SD-WAN implementation, these connections shouldn't need to be redundant. Customers should be able to think of the connections between their site and an SD-WAN core as a single, aggregated pipe. They should be able to use all available connectivity when everything is running as it should, falling back to a single underlying connection if either fails.

This should be the default operating state for a capable SD-WAN, but a solution should offer more flexibility for those with specific needs. For example, customers should be able to incorporate metered circuits as redundant backup connections when necessary, so they don't incur unnecessary expenses.

- **DOES IT OFFER A GRACEFUL FAILOVER?**

Not all failover handling is the same. Some SD-WAN vendors may change your IP address while failing over to a redundant connection, which will disrupt your latency-sensitive, stateful applications. Look for an SD-WAN solution that can accommodate a connection failure while maintaining the same IP address for your network.

The Bigleaf and Sierra Wireless MCS solution achieves this by tunneling your connection to the core gateway cluster and using a Bigleaf-provided IP address. The result is application-independent failover that won't drop any connections. Everything from VoIP calls to videoconferencing and remote desktop sessions continue to run uninterrupted.

- **CAN IT COPE WITH A WIDE VARIETY OF CONNECTIONS?**

A capable SD-WAN solution should be able to serve customers in remote rural locations, not just in dense, well-served urban areas. Customers in remote locations may rely on a satellite link or a 4G connection. Make sure that your SD-WAN solution can support a wide range of connectivity options, including metered wireless links where necessary. Reliable, continuous, real-time access to remote applications, such as mobile workforce management and work order and outage management tools, ensure efficient use of service vehicles.

- **HOW INTEROPERABLE IS IT WITH EXISTING SECURITY SOLUTIONS?**

Enterprises adopt a range of approaches to network security, many of which involve complex connections to LAN and WAN devices. An SD-WAN connection

should not need deep integration into your existing security solution. Pick an SD-WAN provider that is security-agnostic, exposing a WAN IP address that will enable you to use your existing security configuration without investing time and effort in complex reconfiguration.

- **CAN IT OFFER DYNAMIC QOS IN BOTH DIRECTIONS?**

An SD-WAN should be able to rank traffic in real time by understanding the traffic and its latency requirements. The SD-WAN should be able to support this functionality even on a single circuit.

SD-WAN networks often use policy-based quality of service (QoS) to work out which applications' network traffic to prioritize. The problem with that approach is the complexity and volatility of application portfolios.

Look for an SD-WAN provider that can classify your traffic based on heuristics, no matter what the application is.

Ask your potential provider if they can distinguish VoIP from Salesforce or virtual desktop sessions and more, without complex manual configuration.

Ensure that the SD-WAN provider supports QoS on a two-way basis, monitoring and prioritizing traffic traversing the WAN from the client device back to the server.

- **IS ITS NETWORK LOAD BALANCING EFFICIENT?**

An effective SD-WAN solution will complement its QoS with load balancing that prioritizes traffic over the most effective circuit, but load balancing options vary.

Many SD-WAN companies watch traffic status by flooding the line with packets, which affects network performance. Bigleaf measures traffic status, sending 10 monitoring packets per second to check traffic status, enabling it to pinpoint performance across its circuits.

- **WILL I NEED MUCH TECHNICAL ABILITY TO DEPLOY AND SUPPORT SD-WAN?**

Ask your SD-WAN provider about installation and management overheads. Look for a solution that decreases setup time and cost by working with your existing routers. A well-configured SD-WAN should manage QoS and reliability so that remote users don't need an engineer on-site to fix things.

## How Bigleaf and Sierra Wireless Can Help

Sierra Wireless and Bigleaf have joined forces to create a powerful partnership that guarantees reliability and performance in enterprise networks.

Bigleaf, Sierra Wireless' SD-WAN partner, offers companies an easy way to migrate applications from the data center to a hosted cloud environment, such as on-premises Exchange to Office 365.

Traffic runs from the end-user LAN across a carrier's connection to a Bigleaf core cluster. Bigleaf locates these clusters at strategic data centers across the country,

and they then exchange traffic with each other across a core network owned and operated by Bigleaf. The company's entire infrastructure uses software-based configuration to optimize its customers' wide-area traffic, prioritizing and balancing the traffic between circuits.

Sierra Wireless has combined Bigleaf's offering with MCS to provide to provide a comprehensive SD-WAN solution to businesses. MCS offers connectivity as a service, providing all the necessary components of a connectivity solution in a bundled offering including hardware, installation, network access, cloud-based monitoring and around-the-clock support. MCS is available for a single, easy-to-manage monthly price and guarantees network uptime via a service level agreement.

As part of the MCS offering, the Bigleaf SD-WAN provides a simple, turnkey experience to migrate WAN traffic into an optimized environment. Customers point their equipment to an IP address provided by MCS and Bigleaf and then continue operations as normal, but with a range of added benefits.

Together with Bigleaf, we're working to simplify and find new efficiencies in complex client networks. Our combined solution supports the network needs of a modern enterprise.

#### RETHINKING WIDE-AREA NETWORKING FOR A MAJOR REMANUFACTURER

Working together, Sierra Wireless MCS and Bigleaf used SD-WAN connectivity to drive efficiencies for a large remanufacturing company that focuses on rebuilding and installing engines and transmissions. The customer needed resilient, managed connectivity for its voice and data systems.

The company used sensors to gather and communicate machine data in real time. It needed high availability connectivity because its precision machining needed split-second timing, meaning that the connection between the sensor and the cloud must be rock solid. The company also needed low latency for voice calls, which it also ran over the WAN.

The SD-WAN solution that Sierra Wireless MCS and Bigleaf installed provided reliable connectivity with impeccable QoS, using 4G LTE connections to enhance the customer's existing communication infrastructure. It could guarantee high-availability, managed connectivity at 99.9% uptime.

## Conclusion

A robust SD-WAN solution will not only support your wide-area network now but will also form a solid foundation for future developments. By using a flexible infrastructure that configures itself to support your network operations, the reliability and performance gains you get from SD-WAN today will endure tomorrow.

Sierra Wireless and Bigleaf can help prepare your network for future challenges by using software to make it more reliable, more responsive and easier to manage.

For more information, visit [sierrawireless.com/mcs](http://sierrawireless.com/mcs).

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<sup>1</sup> "Cisco Visual Networking Index: Forecast And Trends, 2017–2022 White Paper". Cisco, 1 Mar. 2019, <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white-paper-c11-741490.html>.

<sup>2</sup> "Cisco Visual Networking Index: Forecast And Trends, 2017–2022 White Paper". Cisco, 1 Mar. 2019, <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white-paper-c11-741490.html>.

### About Sierra Wireless

Sierra Wireless (NASDAQ: SWIR) (TSX: SW) is an IoT pioneer, empowering businesses and industries to transform and thrive in the connected economy. Customers Start with Sierra because we offer a device to cloud solution, comprised of embedded and networking solutions seamlessly integrated with our secure cloud and connectivity services. OEMs and enterprises worldwide rely on our expertise in delivering fully integrated solutions to reduce complexity, turn data into intelligence and get their connected products and services to market faster. Sierra Wireless has more than 1,300 employees globally and operates R&D centers in North America, Europe and Asia.

For more information, visit [www.sierrawireless.com](http://www.sierrawireless.com).

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